

EPA ID: MAD982547317 Site Name: AT & T (FORMER)

State ID:

Alias Site Names: AT & T

City: NORTH ANDOVER

County or Parish: ESSEX

State: MA

Refer to Report Dated: 08/06/2001

Report Type: SITE INSPECTION 001

Report Developed by: HNUS



SEMS DocID

630204

DECISION:

☐ 1. Further Remedial Site Assessment under CERCLA (Superfund) is not required because:☐ 1a. Site does not qualify for further remedial site assessment under CERCLA (No Further Remedial Action Planned - NFRAP)☐ 1b. Site may qualify for action, but is deferred to:☒ 2. Further Assessment Needed Under CERCLA:2a. Priority: ☐ Higher ☒ Lower

2b. Other: (recommended action) Low

DISCUSSION/RATIONALE:

This site is being addressed via the state program, and is assigned "State lead" status. No further actions are anticipated by the federal Superfund remedial program, pending completion of state program activities.

Site Decision Made by: NANCY SMITH

Signature: _____

Date: 08/10/2001

FINAL SITE INSPECTION REPORT
FOR
AT&T (Former)
NORTH ANDOVER, MASSACHUSETTS

CERCLIS NO. MAD982547317

SITE INSPECTION
RESPONSE ACTION CONTRACT (RAC), REGION I

Prepared for:

U.S. Environmental Protection Agency
Region I
Office of Site Remediation and Restoration
Boston, MA 02114-2023

EPA CONTRACT NO. 68-W6-0045
EPA WORK ASSIGNMENT NO. 032-SISI-01ZZ

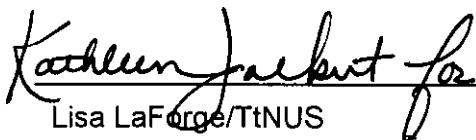
TtNUS PROJECT NO. N0073-1800
TtNUS DOCUMENT NO. RI01656F

Submitted by:


Tetra Tech NUS, Inc.
55 Jonspin Road
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August 2001

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8-8-01
Date


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Project Manager

8-8-01
Date

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1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) requested that Tetra Tech NUS, Inc. (TtNUS) perform a Site Inspection (SI) of the AT&T (former) property, located in North Andover, Massachusetts. This work was performed under Contract No. 68-W6-0045, and EPA Work Assignment No. 032-SISI-01ZZ. Tasks were conducted in accordance with the SI scope of work provided by EPA and the Draft Work Plan dated December 1998 submitted by TtNUS. A Preliminary Assessment (PA) report for the AT&T (former) property was prepared by Massachusetts Department of Environmental Quality Engineering [MADEQE, currently Massachusetts Department of Environmental Protection (MADEP)] on September 29, 1988. On the basis of the information provided in the PA report, the AT&T (former) SI was initiated.

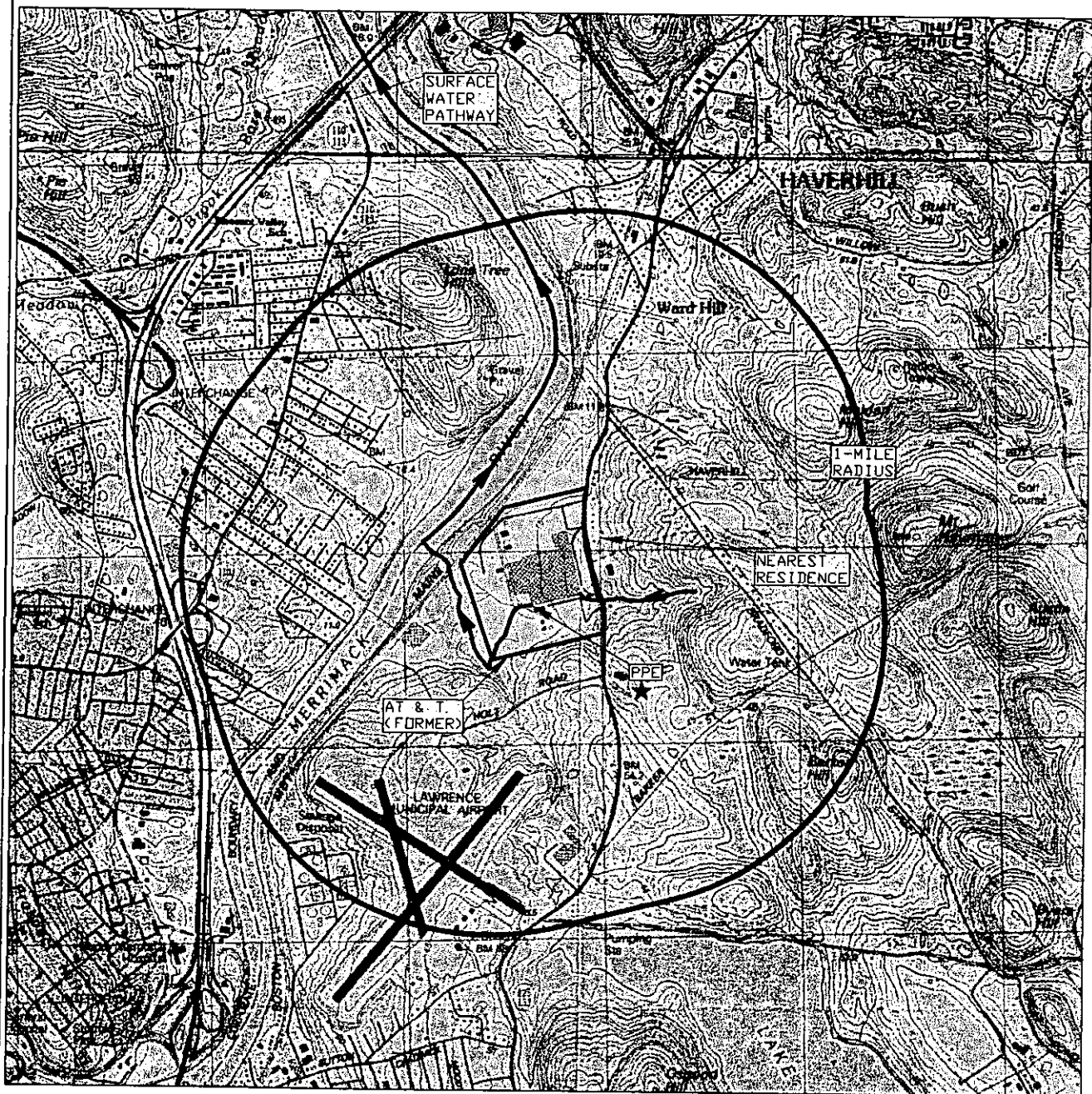
Background information used in the generation of this report was obtained through file searches conducted at EPA, MADEP, telephone interviews with town officials, conversations with persons knowledgeable of the AT&T (former) property, and conversations with other Federal, State, and local agencies.

This report follows the guidelines developed under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, commonly referred to as Superfund. However, these documents do not necessarily fulfill the requirements of other EPA Region I regulations such as those under the Resource Conservation and Recovery Act (RCRA) or other Federal, State, or local regulations. SIs are intended to provide a preliminary screening of sites to facilitate EPA Region I's assignment of site priorities. They are limited efforts and are not intended to supersede more detailed investigations.

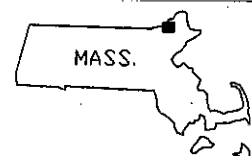
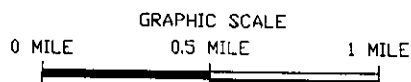
2.0 SITE DESCRIPTION

The AT&T (former) property is located at 1600 Osgood Street (Route 125) in North Andover, Essex County, Massachusetts. The geographic coordinates as measured from the center of the property are 42° 43' 54.1" north latitude and 71° 06' 58.9" west longitude (Figure 1) [5; 6]. The property is currently owned and operated by Lucent Technologies Optical Networks Group (Lucent). The 168-acre property is characterized as 115 acres developed, 40 acres in woodlands, 5 acres wetlands, and 8 acres of floodplain (Figure 2) [1, p. 1-1].

The site is bound to the east by Osgood Street (Route 125), to the north and northwest by a Boston and Maine Railroad easement and then the Merrimack River, and to the south and southwest by an unnamed stream and the Holt Road Landfill [10].



BASE MAP IS A PORTION OF THE FOLLOWING 7.5 X 15 MINUTE USGS QUADRANGLES:
HAVERHILL, MASSACHUSETTS-NEW HAMPSHIRE, 1987;
LAWRENCE, MASSACHUSETTS-NEW HAMPSHIRE, 1987.



QUADRANGLE LOCATION

SITE LOCUS

AT & T (FORMER)

NORTH ANDOVER, MASSACHUSETTS

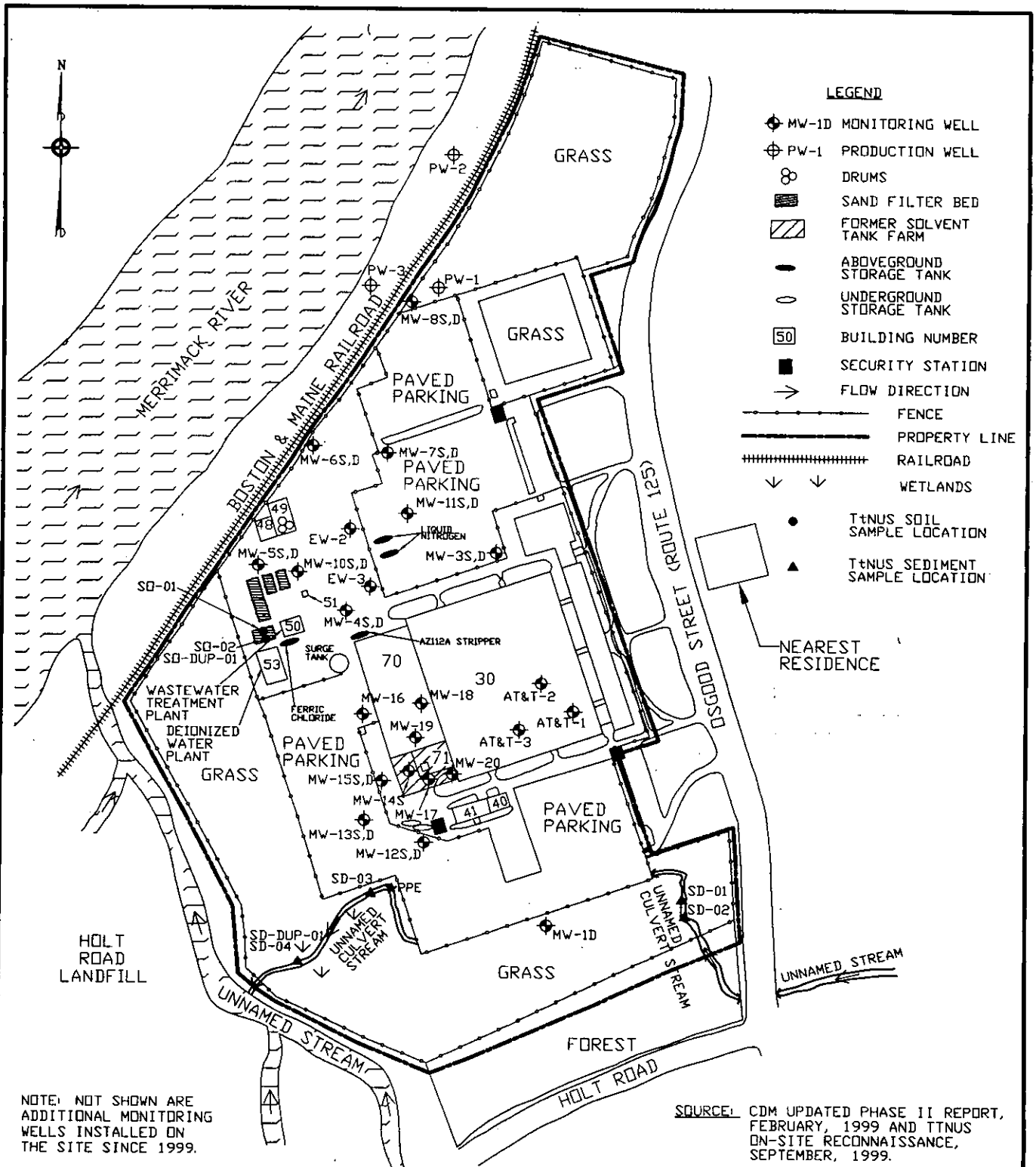
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SCALE:	AS NOTED	ACAD NAME:	DWG\0073\1880\FIG_1.DWG

FIGURE 1



TETRA TECH NUS, INC.

55 Jonspin Road Wilmington, MA 01887
(978)658-7899



SITE SKETCH

AT & T (FORMER)

NORTH ANDOVER, MASSACHUSETTS

DRAWN BY:	D.W. MACDOUGALL	REV.:	1
CHECKED BY:	J. PILLION	DATE:	JULY 26, 2001
SCALE:	NOT TO SCALE	ACAD NAME:	DWG\0073\1880\FIG_2.DWG

FIGURE 2



TETRA TECH NUS, INC.

55 Jonspin Road
Wilmington, MA 01887
(978)658-7899

The topography of the property is generally flat with a gentle slope towards the Merrimack River [10]. The surface water runoff is captured by a series of catch basins and directed to a storm water piping network that conveys the water to one of three culverts for discharge to the Merrimack River [10; 36]. The property's elevation varies between 30 feet (ft) in the northwest corner of the property to 48 ft on the eastern portion of the property [1, p. 4-1]. The property is located in an industrial section of North Andover [2, p. 1].

3.0 OPERATIONAL AND REGULATORY HISTORY AND WASTE CHARACTERISTICS

In 1956, the AT&T Merrimack Valley Works facility was constructed on former farm land [1, p. ii]. Information pertaining to the owners of the property prior to 1956 was not included in the available file. From 1956 to 1996, the AT&T (Former) property was used to manufacture telecommunication transmission equipment. In 1996, AT&T Corporation transferred ownership and operational control of the Merrimack Valley Works to Lucent Technologies, Inc. [36]. Since 1996, Lucent has used the facility to design, test, and assemble telecommunication transmission equipment [10].

AT&T (former) used various industrial solvents, etchants, and other chemicals in their manufacturing and assembly processes. AT&T (former) was listed as a generator of hazardous waste on Resource Conservation and Recovery Information System (RCRIS) [2, p.2]. Currently, Lucent is listed as a large quantity generator of hazardous waste on RCRIS [26]. Several organic materials were typically stored on the property in the past in both underground storage tanks (USTs) and drums, which included trichloroethylene (TCE), toluene, acetone, varsol, methyl chloroform, gasoline, ammonia etchant, waste solvents, waste acetone and water mixture, spent ammonia etchant, spent copper electroplating solution, and spent brulin (etchant) [2, p. 2].

In 1986, AT&T initiated operations to remove, replace, and/or decommission USTs and associated piping for more efficiency in maintenance and monitoring [2, p. 2].

In January 1986, AT&T engineers identified "low levels" of chlorinated solvents and petroleum hydrocarbons in water from production wells 1 and 3. Analytical results of groundwater samples using EPA Methods 601, 602, and 624, indicated that production wells 1 and 3 were contaminated with volatile organic compounds (VOCs). Subsequently, Camp, Dresser, and McKee, Inc. (CDM) was hired by AT&T to investigate the extent of the contamination at the property and to assist in the removal of USTs [2, p. 2].

In a February 1988 Phase II Hydrogeologic Investigation report, CDM identified the following potential sources for groundwater and soil contamination:

- Former solvent tank farm area containing nine USTs were removed from the property between 1986 and 1987 by Chemical Waste Management (CWM); however, there is no available file information on these tank disposals.

- Waste solvent UST was removed from the property in 1986; however, there is no available file information on this tank disposal.
- Waste acetone UST, was cleaned, filled with grout, and abandoned in place in 1987 by CWM.
- Barrel pad area was located approximately 150 feet northwest of Building 51. This area, which consisted of a waste solvent UST and an aboveground barrel storage facility, was removed from the property in 1985; however, there is no available file information on the tank disposals [2, p. 2; 36].

CDM reported that as part of AT&Ts tank decommissioning plan, 17 USTs were decontaminated and then removed and one UST was abandoned in place (with the approval of the North Andover Fire Marshall) [2, p. 3; 29, pp. 1, 6]. Available file information discusses only 11 of the USTs removed and the one UST abandoned, which included a 5,000-gallon gasoline UST, a 7,500-gallon waste acetone UST, waste oil UST, and nine solvent USTs and associated piping in the tank farm area. The nine solvent USTs included the following: 10,000-gallon TCE, 5,000-gallon acetone, 500-gallon acetone, 500-gallon varsol, 1,000-gallon varsol, 1,000-gallon toluene, and three 1,000-gallon methylchloroform [1,1,1-trichloroethane (1,1,1-TCA)] USTs. The waste acetone UST was decontaminated and abandoned in place [29, p. 6]. The waste oil UST was removed in 1986; however, the location and capacity of the waste oil UST was not included in available file information [29, pp. 6-7].

Soils unearthed during the solvent tank farm excavation in 1986 were screened for VOCs. Composite samples from soil piles were analyzed using EPA Method 8240 and soils containing VOCs in concentrations greater than 1 part per million (ppm) were removed off site by a licensed hazardous waste hauler to an approved disposal facility. VOCs detected included 1,1,1-TCA, toluene, 1,2-dichloropropane, methylene chloride, and TCE. Of the 570 cubic yards (yd³) of soil unearthed in the solvent tank farm excavation area, approximately 300 yd³ were transported off site by Suffolk Services, Inc. to SCA Chemical Services in Model City, New York. The remaining 270 yd³ was determined by CDM to be "uncontaminated" and returned to the excavation area [2, p. 3; 29, pp. 8-9].

In 1987, CDM installed an air stripper on the property to treat contaminated water encountered during dewatering activities in the solvent tank farm area. Effluent from the air stripper was discharged to the on-site wastewater treatment plant which discharges to the Merrimack River. Groundwater remediation occurred between February 23, 1987 and May 28, 1987. Approximately 50,000 gallons of water were recovered and treated. Prior to discharging, CDM collected influent and effluent samples from the air stripper on a weekly basis. The samples were analyzed for VOCs using EPA Method 624. Results indicated that the concentrations were detected below the limit specified in the NPDES outfall permit. In addition, CDM installed 21 monitoring wells on the property in 1987. Analytical results of groundwater samples from the monitoring wells indicated VOCs were detected in 18 of the 21 wells. The following VOCs were detected toluene, TCE, and 1,1,1-TCA. The concentrations detected ranged from 19 parts per billion (ppb) to 208,706 ppb total VOCs [2, pp.3-4].

The on-site wastewater treatment plant is required to operate under the regulations of the National Pollutant Discharge Elimination System (NPDES). The joint NPDES permit numbers are: Federal No. MA0001261 and State No. 352 [2, p. 3]. The NPDES permit was originally issued in 1974. The most recent version of the NPDES permit was issued in 1992 [30].

A groundwater remediation program was initiated in November 1990. The remediation system consists of 2 extraction wells (EW-2 and EW-3) pumping groundwater to the air stripper tower measuring 5 ft in diameter and 45 ft in height. The groundwater treatment system is currently in operation and its purpose is to extract and treat VOCs from groundwater at the AT&T (former) property. The off gas from the air stripper tower is treated by passing the stream through a vapor recovery system, consisting of four 1,130 lbs vapor phase carbon units [3, p. 1]. The vapor phase carbon units are replaced approximately every 4 months, as necessary, and disposed off site as hazardous waste by a licensed hazardous waste transporter [10]. Previously, the treated effluent water drained from the air stripper tower by gravity to a 100,000-gallon open-air surge tank connected to a 20,000-gallon underground sump tank. The effluent was fed from the tanks to a deionized water treatment plant on the property for use as process water [3, p. 1]. The water was treated at the water treatment plant which discharged to the Merrimack River in compliance with the NPDES permit [3, p. 1; 4, p. 1]. Currently, the treated effluent water discharges directly to the storm drain [35]. Between November 1990 and December 1998, approximately 500 million gallons of groundwater had been treated. This system removed approximately 3,000 lbs of VOCs, approximately 1,800 lbs of which was TCE [1, p. ii].

In December 1992, contamination was noted in a former caustic cleaning room in Building 30 by AT&T workers during excavation activities of the floor slab and shallow soil to install new process equipment. In response to this noted contamination, CDM collected soil samples, soil gas samples, and installed three groundwater monitoring wells (AT&T-1, AT&T-2, and AT&T-3) in the vicinity of the sump in Building 30 [1, pp. iii, 3-1]. Further details regarding groundwater and soil sampling results were not included in available file information. In 1993, CDM conducted the soil gas survey at the building sump area in Building 30. Results indicated that detectable concentrations of TCE (greater than 50 ppb volume (ppbv)) were present at distances 200 ft from the suspected sump source area. Soil gas concentrations of TCE above 25 ppm volume (ppmv) were identified in shallow soils up to 150 ft from the source area [1, pp. 3-23]. In addition, quarterly sampling of the ambient building air was instituted to monitor for VOCs [1, pp. iii, vi, 3-1].

In December 1993, CDM collected groundwater samples from 18 on-site monitoring wells and analyzed the samples for VOCs by EPA Method 8240 [4]. Analytical results indicated seven VOCs were detected in groundwater from shallow and deep wells at concentrations greater than or equal to the background sample's sample reporting limit (SRL) [4]. Refer to the groundwater pathway section of this report for additional details and analytical results.

CDM collected groundwater samples from 19 monitoring wells including production wells PW-1, PW-2, and PW-3 on the AT&T (former) property in December 1995. Samples were analyzed for VOCs by EPA Method 8240 [3]. Analytical results indicated that seven VOCs were detected in groundwater from the on-site wells at concentrations greater than or equal to the reference sample's SRL [4]. Refer to the groundwater pathway section of this report for additional details and analytical results.

In November 1996, CDM installed five additional monitoring wells in three locations to characterize groundwater in the area next to Building 71. Building 71 was constructed over the former tank farm area following the 1986 excavation of VOC contaminated soil. The five wells installed were MW-12S, MW-12D, MW-13S, MW-13D, and MW-14S [1, p. 3-1]. In December 1996, CDM sampled the five monitoring wells. Analytical results of groundwater sampling indicated TCE at concentrations as high as 310,000 ppb. Monitoring wells MW-2S and MW-2D were removed during the construction of the building [1, pp. iii, 3-1]. According to MADEP, groundwater beneath the site is categorized under the Massachusetts Contingency Plan (MCP) as GW-2 due to the relative shallow depth to groundwater and the presence of an occupied building. Substances above GW-2 standard are considered to be a potential source of vapors to indoor air. The GW-2 standard for TCE (in groundwater) is 300 ppb [37].

During June, July, October, and November 1998, Lucent conducted additional subsurface investigations to evaluate the groundwater quality in the area of the former solvent tank farm for extent of TCE contamination at the property [1, p. 3-1]. Seven groundwater monitoring wells (MW-15S, MW-15D, MW-16, MW-17, MW-18, MW-19, and MW-20) were installed by CDM. September 1998 sampling of these wells revealed TCE at a maximum concentration of 470,000 ppb [1, p. 3-9].

In June 1998, CDM conducted another soil gas survey in the area of the former tank farm. Samples were collected from inside Buildings 30, 70, and 71 and outside in the shipping/receiving courtyard [1, p. 3-23]. Again, soil gas survey results indicated that concentrations of TCE above 50 ppbv were present at distances 200 ft from the suspected source. Soil gas concentrations of TCE above 25 ppmv were found in soils up to 150 ft from the source area [1, p. 3-23].

In November 1998, 10 ground level ambient air samples were collected by CDM from selected locations inside Buildings 30, 70 and 71. Air samples were analyzed for VOCs using EPA Method TO-15. The samples were collected using Summa canisters with a 6 liter capacity with a 24 hour duration [1, p. 3-24]. Analytical results indicated TCE at a concentration of 190 ppbv in one sample from Building 71. CDM reported that this result was a potential health risk if detected in the breathing zone [1, p. 3-26]. TCE and tetrachloroethylene (PCE) were detected in other sample locations in Building 30 and Building 70 [1, p. 3-26].

In December 1998, three additional ground level ambient air samples were collected in Building 71 to confirm the November 1998 sample results. Analytical results indicated TCE at a concentration of 810 ppbv in one sample which again could present a risk if in the breathing zone [1, p. 3-26].

Due to these air sample results, Lucent initiated a Release Abatement Measure (RAM) in February 1999 to mitigate infiltration of VOC vapors from the subsurface to the building air. The RAM consisted of sealing all visible cracks in the floor of Buildings 30, 70, and 71. Following the RAM actions, air samples were collected from the breathing zone. According to CDM, no VOCs were detected in the breathing zone at concentrations that pose a significant health risk [1, p. 3-26].

On September 29, 1999, TtNUS team personnel conducted an on-site reconnaissance of the AT&T (former) property. TtNUS team personnel noted the following 10 buildings on the property: the main manufacturing facility (Building 30), power plant (Building 41), garage (Building 40), receiving warehouse (Building 71), shipping warehouse (Building 70), air stripper remediation system (Building 51), deionized water (Building 53), wastewater treatment plant (Building 50), hazardous waste storage area (Building 49), and the former chemical storage area (Building 48). The former chemical storage area (Building 48) was undergoing renovations, and according to Lucent representatives, will be converted to a manufacturing shop [10]. TtNUS team personnel observed four sanitary wastewater treatment sand filter beds, each approximately 30 ft by 60 ft, located north-northwest of Building 50. Lucent representatives informed TtNUS team personnel that the sand filter beds are currently only used in emergency situations [10; 36]. A fifth uncovered sand filter bed, approximately 1,800 square feet (ft²) and located west of Building 50, was used for industrial wastewater sludge dewatering [10; 36]. The sand filter beds were not overgrown with vegetation [10]. In 2001, the contents of the industrial sludge dewatering filter sand bed and under drainage system have been removed and disposed of off-site as F006 waste [36].

Approximately 12 55-gallon drums containing hazardous waste were observed by TtNUS team personnel in Building 49. Lucent representatives informed TtNUS team personnel that the hazardous waste generated at the facility includes rags saturated with isopropanol, solder paste, and waste oils. All hazardous waste drums are shipped off site for disposal by a licensed transporter [10].

TtNUS team personnel observed a 8,000-gallon ferric chloride aboveground storage tank (AST) south of Building 50 and a 6,000-gallon AZ112A stripper with glycol ethers AST (not associated with the air stripper) north of Building 70 [10; 35]. According to Lucent representatives, the AZ112A stripper and the ferric chloride ASTs were decommissioned and cleaned in 2000 and 2001, respectively, and will be scheduled to be removed from the property [10; 35; 36]. There were two liquid nitrogen ASTs on the property each approximately 30 ft tall and 10 ft in diameter, which according to Lucent representatives are owned by BOC Gas. The liquid nitrogen tanks are located northwest of Building 30 in a paved area. According to Lucent representatives, there are two USTs currently on the

property, one 6,000-gallon gasoline UST and one 2,000-gallon diesel UST. These two USTs are located west of Building 41 [10; 30].

During the on-site reconnaissance, TtNUS team personnel observed an unnamed stream which flows along the southeastern border of the property. This stream is culverted beneath the property, prior to emerging along the southwestern property border. The unnamed culvert stream enters into an offsite unnamed stream and then flows into the Merrimack River [10; 35].

The property is surrounded by a maintained chain-link fence with barbed wire. Three guarded gates provide vehicle and pedestrian access to the property; however, access is restricted to security card holders only. In general, the areas surrounding the buildings are paved and used for parking. There is a grass covered area between the fence and the parking areas on the south, southwestern, and northern portions of the property. The nearest residence is located on Osgood Street approximately 100 ft east of the property. TtNUS team personnel did not observe any stressed vegetation or stained soils on the AT&T (former) property. TtNUS team personnel observed approximately 36 wells throughout the property, including two extraction wells and monitoring wells located inside Buildings 30, 70, and 71. According to Lucent representatives, there are currently 62 monitoring wells on-site [36]. All the wells observed by TtNUS team personnel were capped and appeared to be in good condition. There are inactive production wells on the property [10].

On April 11, 2000, TtNUS team personnel collected three soil/source samples from two cells of one on-site industrial wastewater sand filter bed on the property and five sediment samples from the unnamed culverted stream [10]. Source, sediment, and quality assurance/quality control (QA/QC) samples were analyzed for the following parameters: VOCs, semivolatile organic compounds (SVOCs), pesticides/polychlorinated biphenyls (PCBs), metals, and cyanide [31; 32].

As directed by EPA, TtNUS performed a Tier I evaluation of the SI sample analytical results according to Region I EPA - New England Data Validation Functional Guidelines for Evaluating Environmental Analyses (December 1996). A Tier I evaluation consists of checking for data completeness, (i.e. that the complete set of analytical results and supporting information for all of the samples have been received by TtNUS from the Contract Laboratory Program (CLP) and Delivery of Analytical Services (DAS) laboratories). Under a Tier I data validation, no qualifications are made to the laboratory-reported values to account for field or laboratory QA/QC issues (i.e., holding times, instrument calibrations, blank contamination, matrix spikes, recoveries, etc.). Therefore, detection of chemicals at low concentrations, or at concentrations near the sample quantitation limit, could be considered false positive values due to blank contamination or based on some other criteria identified during a more rigorous Data Validation (i.e. Tier III). In particular, this could be the case for the common laboratory organic compound contaminants: acetone, methylene chloride, 2-butanone, toluene, and phthalates.

Analytical results indicated three VOCs, 18 SVOCs, two pesticides, one PCB, and two inorganics were detected in the sediment samples. Analytical results indicated four VOCs, 13 SVOCs, one pesticide, and 18 metals and cyanides were detected in soil/source samples [31; 32]. Refer to the Surface Water Migration Pathway and the Waste/Source Sampling sections, respectively for additional information and analytical results.

AT&T (former) is the only property in North Andover listed on the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) list [25]. In addition to Lucent, there are 40 facilities governed by RCRIS [26].

Table 1 summarizes structures or areas on the AT&T (former) site that are documented or potential sources of contamination, the containment factors associated with each source, and the relative location of each source.

Table 1
Source Evaluation for AT&T (Former)

Source Area	Containment Factors	Spatial Location
Abandoned Waste Acetone UST	None	Exterior northwest section of Building 70
Former Solvent Tank Farm	None	Southwest corner of Building 30/Part of Building 71
Hazardous Waste Storage Area	Concrete berm	Building 49
Vapor Phase Carbon Units	None	On-site remediation system
Former Sand Filter Beds	Collection System	North-northwest and west of Building 50
Contaminated Soil	None	Caustic cleaning room area in Building 30
Surge Tank	None	Southeast of Building 53
Underground Sump Tank	Unknown	Southeast of Building 53
Former Ferric Chloride AST	Walled	South of Building 50
Former AZ112A Stripper AST	Double-walled with a leak detection system	Exterior north side of Building 70
Liquid Nitrogen ASTs	None	North of Building 30.
Former Gasoline UST	Unknown	Southwest of Building 41
Gasoline and Diesel USTs	Double-walled with a leak detection system	West of Building 41
Former Waste Oil UST	Unknown	Unknown

Former Waste Solvent USTs	Unknown	Unknown
Former Barrel Pad Area	Unknown	Unknown
Former USTs	Unknown	Unknown
On-site Wastewater Treatment Plant	Concrete floor	Building 50
Former Chemical Storage Area	Concrete berm	Building 48

[1, pp. ii, 3-23; 2, pp. 2-3; 3, p. 1; 10; 29, pp. 4, 6-9; 30; 36]

AST = Aboveground storage tank

UST = Underground storage tank

Table 2 summarizes the types of potentially hazardous substances which have been disposed, used, or stored on the AT&T (former) property.

Table 2
Hazardous Waste Quantity for AT&T (Former)

Substance(s)	Quantity or Volume/Area	Years of Use/Storage	Years of Disposal	Source Area
Waste acetone	7,500-gallon UST	1956-1987	1956-1987	Building 70
TCE, acetone, methylchloroform, toluene, varsol, acetone	One 10,000-gallon UST, one 5,000-gallon UST, 5 1,000-gallon USTs, and two 500-gallon USTs	1956-1987	1956-1987	Former solvent tank farm
Isopropanol, solder paste, and waste oils	12 55-gallon drums	1990-present (drum storage)	1990-present (drum storage)	Hazardous waste storage area of Building 49
VOCs/TCE	3,000 pounds/1,800 pounds	1990-1998	1990-1998	Vapor phase carbon units
TCE	Approximately 50,000 ft ²	Unknown	Unknown	Soil gas contamination under caustic cleaning room area in Building 30
Treated effluent water	100,000-gallon tank	1990 - present	1990 - present	Surge tank
Treated effluent water	20,000-gallon tank	1990 - present	1990 - present	Underground sump tank
Ferric chloride	8,000-gallon AST	Unknown-2001	Unknown-2001	South of Building 50
AZ112A Stripper with glycol ethers	6,000-gallon AST	Unknown-2000	Unknown-2000	Exterior north side of Building 70
Liquid nitrogen	two 30 ft tall and 10 ft in diameter	Unknown-present	Unknown-present	North of Building 30

Gasoline, waste oil, waste solvent	5,000-gallon UST/ unknown	1956-1986	1956-1986	Southwest of Building 41/Unknown
Gasoline, diesel	6,000-gallon and 2,000-gallon USTs	1986-present	1986-present	West of Building 41
Waste solvent	unknown	Unknown-1986	Unknown-1986	Barrel Pad Area
VOCs	Unknown	1974-unknown	1974-unknown	Wastewater Treatment Plant
benzene, acetone, 2-butanone, 2-hexanone, anthracene, fluoranthene, pyrene, chrysene, bis(2-ethylhexyl)phthalate, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)perylene, benzaldehyde, dimethylphthalate, delta-BHC, aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, vanadium, zinc, and cyanide	Unknown	Unknown	Unknown	Industrial wastewater sand filter bed west of Building 50
acetone, 2-butanone, 4-methyl-2-pentanone, fluorene, phenanthrene, anthracene, carbazole, fluoranthene, pyrene, butylbenzylphthalate, chrysene, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, benzo(g,h,i)perylene, benzaldehyde, endrin ketone, gamma-chlordane, aroclor-1254, selenium, and cyanide	Unknown	Unknown	Unknown	On-site unnamed culvert stream

[1, pp. ii, 3-23; 2, pp. 2-3; 3, p. 1; 10; 29, pp. 4, 6-9; 30; 31; 32; 36]

TCE = Trichloroethylene

UST = Underground storage tank

VOC = Volatile organic compound

AST = Aboveground storage tank

4.0 WASTE/SOURCE SAMPLING

On April 11, 2000, TtNUS team personnel collected three soil/source samples from two cells of one on-site industrial wastewater sand filter bed on the property [10]. Source and QA/QC samples were analyzed for the following parameters: VOCs, SVOCs, pesticides/PCBs, metals, and cyanide [31; 32].

Table 3 summarizes soil/source samples collected by TtNUS team personnel from the AT&T (former) property on April 11, 2000.

Table 3
Sample Summary: AT&T (Former)
Soil/Source Samples Collected by TtNUS on April 11, 2000

Sample Location No.	Traffic Report No.	Time (hours)	Grab/ Comp.	Sample Depth (Inches)	GPS Data (Latitude/ Longitude)	Sample Information
MATRIX: Soil/Source						
18-SO-01 MS/MSD	DO1205	1108	Grab	0 to 24	42° 43' 53.5" N 71° 07' 11.2" W	Soil/source sample collected from the industrial wastewater sand filter bed west of Building 50. Sample appeared to be tan sand with red/purple sand at ~2 feet; PID = 0.
18-SO-02	DO1206	1120	Grab	0 to 24	42° 43' 53.5" N 71° 07' 11.2" W	Soil/source sample collected from the industrial wastewater sand filter bed west of Building 50. Sample appeared to be black/dark brown sand (0 to 4 inches) over tan sand; PID = 0.
18-SO-DUP-01	DO1207	1127	Grab	0 to 24	42° 43' 53.5" N 71° 07' 11.2" W	Duplicate of 18-SO-02, collected for quality control.

MS/MSD = Matrix Spike/Matrix Spike Duplicate
~ = Approximately
PID = Photoionization Detector
GPS = Global Positioning System
Comp. = Composite

[10]

For each sample location, a compound or element is listed if it is detected at a concentration greater than or equal to the SRL. Table 4 summarizes substances detected through DAS analysis of soil/source samples collected by TtNUS team personnel on April 11, 2000.

Table 4
Summary of Analytical Results
Soil/Source Sample Analysis for AT&T (Former) Samples
Collected by TtNUS on April 11, 2000

Sample Location	Compound/ Element	Sample Concentration		
18-S0-01 (D01205)	VOCs			
	acetone	9	JB	ppb
	2-butanone	3	J	ppb
	SVOCs			
	fluoranthene	63	J	ppb
	pyrene	63	J	ppb
	chrysene	67	J	ppb
	bis(2-ethylhexyl)phthalate	470		ppb
	benzo(b)fluoranthene	55	J	ppb
	PESTICIDES			
	delta-BHC	4.9		ppb
	INORGANICS			
	aluminum	1870		ppm
	arsenic	3.2		ppm
	barium	13.3	B	ppm
	beryllium	0.13	B	ppm
	cadmium	0.23	B	ppm
	calcium	1,150		ppm
	chromium	26.9		ppm
	cobalt	2.9	B	ppm
	copper	342		ppm
	iron	4,910		ppm

18-S0-01 (D01205) (Continued)	lead	67.1		ppm
	magnesium	610	B	ppm
	manganese	174		ppm
	nickel	18.1		ppm
	potassium	515	B	ppm
	selenium	1.2	N	ppm
	vanadium	12.1		ppm
	zinc	54.3		ppm
	cyanide	1.2		ppm
18-S0-02 (D01206)	VOCs			
	acetone	250	EB	ppb
	2-butanone	110		ppb
	benzene	1	J	ppb
	2-hexanone	18		ppb
	SVOCs			
	anthracene	41	J	ppb
	fluoranthene	280	J	ppb
	pyrene	230	J	ppb
	benzo(a)anthracene	160	J	ppb
	chrysene	240	J	ppb
	bis(2-ethylhexyl)phthalate	230	J	ppb
	benzo(b)fluoranthene	200	J	ppb
	benzo(k)fluoranthene	88	J	ppb
	benzo(a)pyrene	100	J	ppb
	indeno(1,2,3-cd)pyrene	69	J	ppb
	benzo(g,h,i)perylene	55	J	ppb
	INORGANICS			
	aluminum	2,150		ppm
	arsenic	4.2		ppm

18-S0-02 (D01206) (Continued)	barium	16.5	B	ppm
	beryllium	0.2	B	ppm
	cadmium	0.18	B	ppm
	calcium	1,720		ppm
	chromium	17.3		ppm
	cobalt	2.5	B	ppm
	copper	412		ppm
	iron	6,480		ppm
	lead	71.9		ppm
	magnesium	718	B	ppm
	manganese	373		ppm
	nickel	27.7		ppm
	potassium	645	B	ppm
	vanadium	18.5		ppm
	zinc	24.7		ppm
	cyanide	0.1	B	ppm
18-S0-DUP-01 (D01207)	VOCs			
	acetone	28	B	ppb
	2-butanone	7	J	ppb
	SVOCs			
	fluoranthene	52	J	ppb
	pyrene	45	J	ppb
	chrysene	37	J	ppb
	bis(2-ethylhexyl)phthalate	1,400		ppb
	benzo(b)fluoranthene	59	J	ppb
	benzaldehyde	44	J	ppb
	dimethylphthalate	200	J	ppb
	PESTICIDES			
	delta-BHC	4		ppb

18-S0-DUP-01 (D01207) (Continued)	INORGANICS		
	aluminum	2,000	ppm
	arsenic	3.8	ppm
	barium	20.5 B	ppm
	beryllium	0.17 B	ppm
	cadmium	0.22 B	ppm
	calcium	5,880	ppm
	chromium	20.8	ppm
	cobalt	3 B	ppm
	copper	503	ppm
	iron	6,810	ppm
	lead	135	ppm
	magnesium	695 B	ppm
	manganese	645	ppm
	nickel	42.6	ppm
	potassium	625 B	ppm
	vanadium	21	ppm
	zinc	33.8	ppm
	cyanide	0.45	ppm

ppm = parts per million
 ppb = parts per billion
 VOCs = Volatile Organic Compounds
 SVOCs = Semivolatile Organic Compounds
 J = Estimated value below contract required quantitation limit
 E = Concentration greater than calibration range (organic analysis)
 B = In laboratory blank (organic analysis)
 B = Below contract required detection limit (inorganic analysis)
 N = Spike % R greater than limit

[31; 32]

Analytical results indicated four VOCs, 13 SVOCs, one pesticide, and 19 metals were detected in soil/source samples [31; 32].

5.0 GROUNDWATER PATHWAY

Drumlins and bedrock-dominated uplands border the AT&T (former) property to the east and the south. Bedrock beneath the property is thin to thick-bedded metamorphosed calcareous sandstone, siltstone, and minor muscovite schist of Silurian age [16]. Depth to bedrock beneath the property is approximately 80 ft. No bedrock formations mapped within 4-radial miles of the AT&T (former) property exhibit karst characteristics [10]. During field investigations, CDM encountered five basic stratigraphic units present at the AT&T (former) property:

- A fine silty sand layer extends 20 to 40 ft below ground surface.
- Glacial till lies directly above bedrock, and is either exposed at the ground surface or is covered by the fine sand layer.
- Weathered and fractured stone silt and sandstone bedrock.
- A narrow band of coarse sand and gravel extends non-continuously across the property, and is considered a buried post-glacial channel. It is located 60 to 90 ft below ground surface and is approximately 15 to 30 ft thick and is above bedrock. This buried channel is highly transmissive.
- A relatively impermeable but noncontinuous layer of silts and clays, of varying thickness, exists across the property. The silts and clay lie directly below the fine sand and above either the buried channel or bedrock [1, p. 4-1].

Groundwater was present in the shallow overburden system, in the buried channel cover, and in the bedrock. Depth to groundwater ranges from 9 to 25 ft below ground surface across the AT&T (former) property [1, Appendix B]. CDM determined that groundwater flow across the property is generally in a northwesterly direction toward the Merrimack River in both the shallow and deep aquifer systems [1, p. vi].

The average annual precipitation from 1961-1990 for the Lawrence, Massachusetts area, approximately 2 miles from the AT&T (former) property, is 43.08 inches [7].

The following Massachusetts cities and towns are located within 4-radial miles of AT&T (former): Lawrence, Boxford, Methuen, Haverhill, Andover, North Andover, and Groveland [5; 6].

Andover and North Andover obtain their drinking water supply from groundwater wells, reservoirs, and surface water intakes. Of the three groundwater supply wells, only one, Abbott GP Well, is active; however, it is located greater than 4-radial miles from the property. Additionally, there are two community supply wells, Harold Parker Well and Camp Evergreen Well; however, these wells are also located greater than 4-radial miles from the property [11; 15].

Haverhill does not rely on public groundwater wells for their drinking water supply [12; 15].

Methuen obtains drinking water from two community groundwater supplies (Hickory Hill Golf Course and Jimmys II Restaurant) located greater than 4-radial miles from the AT&T (former) property [15].

Groveland obtains their drinking water from two groundwater wells located greater than 4-radial miles from the AT&T (former) property [15].

Lawrence obtains drinking water from a surface water intake and two community groundwater supplies; the Louise H. Fournier well serving 25 people and the J.H. Horne & Sons Co. well serving 75 people [13; 15]. The Louise H. Fournier supply includes the Bigelow Street Well located 3.7 miles southwest of the property and the May Street Well located 3.4 miles west of the property. The J.H. Horne & Sons Co. supply includes Wells No.1 and No.2 located 3.2 miles southwest of the property. For the purposes of this report it will be assumed that each of these four community wells contributes approximately 25% to their respective populations [15].

Boxford obtains their drinking water from community groundwater wells. Of the 10 active wells, two are located within 4-radial miles of the AT&T (former) property [15]. These two wells include Far Corner Wells No.1 and No.2 which serve approximately 60 people each. Far Corner Wells No.1 and No.2 are located 1.5 miles east of the AT&T (former) property [14].

Table 5 identifies public groundwater supply sources within 4-radial miles of the property.

Table 5
Public Groundwater Supply Sources Within 4-Radial Miles of AT&T (Former)

Distance (miles)/ Direction from Site	Source Name	Location of Source ^a	Estimated Population Served	Source Type ^b
1.5/east	Far Corner Well No.1	Boxford, MA	60	Overburden
1.5/east	Far Corner Well No.2	Boxford, MA	60	Overburden
3.2/southwest	J.H. Horne Well No.1	Lawrence, MA	37	Overburden
3.2/southwest	J.H. Horne Well No.2	Lawrence, MA	38	Overburden
3.7/southwest	Bigelow Street Well	Lawrence, MA	12	Overburden
3.4/west	May Street Well	Lawrence, MA	13	Overburden

^a Indicates Town in which well is located.

^b Overburden, Bedrock, or Unknown.

[11-15]

The population relying on private groundwater supplies within 4-radial miles of the property was estimated using equal distribution calculations of the U.S. Census Bureau's CENTRACTS data identifying population, households, and private water wells for "Block Groups that lie within individual radial distance rings measured from the approximate center of the property. The North Andover Health Department indicated to TtNUS team personnel that there are private wells in North Andover used for drinking water; however, they could not provide the locations of these wells [28]. Based on CENTRACTS data, the nearest private well is located between 0.25-radial to 0.5-radial miles from the property. An estimated 2,365 people within 4-radial miles of the property are served by private groundwater sources [9].

Table 6 summarizes the estimated drinking water populations served by groundwater sources within 4-radial miles of the AT&T (former) property.

Table 6
Estimated Drinking Water Populations Served by Groundwater Sources
Within 4-Radial Miles of AT&T (Former)

Radial Distance from AT&T (former) Property	Estimated Population Served by Private Wells	Estimated Population Served by Public Wells	Total Estimated Population Served by Groundwater Sources Within the Ring
≥ 0.00 to 0.25	0	0	0
> 0.25 to 0.50	2	0	2
> 0.50 to 1.00	83	0	83
> 1.00 to 2.00	438	120	558
> 2.00 to 3.00	728	0	728
> 3.00 to 4.00	1,114	100	1,214
TOTAL	2,365	220	2,585

[9; 11-15]

In January 1986, AT&T engineers identified "low levels" of chlorinated solvents and petroleum hydrocarbons in water from production wells 1 and 3. Sample results using EPA Methods 601, 602, and 624 indicated that production wells 1 and 3 were contaminated with VOCs [2, p. 2]. Further information regarding this sampling event was not included in available file information.

In December 1992, AT&T workers discovered using draeger tubes VOC contamination [33, p. 14]. In response to the VOC contamination, CDM installed three groundwater monitoring wells (AT&T-1, AT&T-2, and AT&T-3) in Building 30 [1, p. 3-1]. Further information regarding groundwater sampling results was not included in available file information.

In December 1993 and December 1995, CDM collected groundwater samples from on-site monitoring wells which also included production wells (in 1995 only) on the property. The groundwater samples were analyzed for VOCs by EPA Method 8240 [3; 4]. Analytical results indicated a number of VOCs detected in groundwater from the shallow and deep wells at concentrations greater than or equal to the reference sample's SRL [3; 4].

There have been 34 monitoring wells and two extraction wells installed at the property since 1986 to 1999. According to a CDM Updated Phase II Report for Lucent Technologies, 24 of the monitoring wells are sampled on a quarterly basis and all 34 of the wells are sampled on an annual basis. The extraction wells are sampled on a monthly basis. In addition, three production wells are sampled, one quarterly and the others annually. Groundwater sampling results for all wells, analyzed for VOCs, between 1996 and 1998 have indicated TCE at concentrations up to 470,000 ppb, vinyl chloride at concentrations up to 150 ppb, and 1,1-dichloroethene at concentrations up to 7,800 ppb [1, p. 3-9].

In 1998, Lucent conducted additional subsurface investigations at the property. The focus of the investigations was to evaluate the groundwater quality in the area of the former solvent tank farm for extent of TCE contamination and to determine whether soil gas volatilizing from the groundwater and/or soil in the area was contaminated. Additional monitoring wells were installed by CDM during this investigation were MW-15S, MW-15D, MW-16, MW-17, MW-18, MW-19, and MW-20 [1, p. 3-1]. In December 1998, CDM collected groundwater samples from 31 wells on the property. Samples were analyzed for VOCs using EPA Method 8260 [1, p. 3-9]. Analytical results indicated 11 VOCs detected in groundwater at concentrations above SRL. SRL values for this sampling event were not included in available file information. The following VOCs were detected in groundwater; acetone, toluene, 1,1-dichloroethylene (1,1-DCE), cis/trans-1,2-dichloroethylene (cis/trans-1,2-DCE), TCE, PCE, chloroform, 1,1-dichloroethane (1,1-DCA), vinyl chloride, and 1,1,1-TCA. TCE concentration ranged from 1.8 to 420,000 ppb (MW-14) [1, Table 3-1]. Sampling results have indicated exceedances of GW-3 standards for TCE in several well [1, p. 3-9]. The state requires the site to meet the criteria to classify the groundwater as GW-3 [1, p. ii].

According to Lucent, a Phase IV Implementation Plan report dated February 2001 was submitted to MADEP by Lucent which includes further site investigation activities and proposed remediation systems [36].

Based on analytical results from previous monitoring well sampling events at the AT&T (former) property, groundwater beneath the property has been impacted by a release of hazardous substances which appears to be attributable to on-site sources. Additionally, based on the location and proximity of private wells and public water supply wells, no nearby drinking water sources are known or suspected to have been impacted by the release from on-site sources. A groundwater treatment system has been in operation since November 1990. Between November 1990 and December 1998, approximately 500 million gallons of groundwater has been treated and discharged to the Merrimack River. The system removed approximately 3,000 lbs of VOCs, approximately 1,800 lbs of which

was TCE [1, p. ii]. According to CDM, the system in place is treating the plume and containing the plume from migration into the Merrimack River [34, p. 1-1].

6.0 SURFACE WATER PATHWAY

The AT&T (former) property is located within the Merrimack River Drainage Basin, approximately 0.1 miles east of the Merrimack River [5]. According to the Flood Insurance Rate Map for the Town of North Andover, the property is in an area outside of the 500-year floodplain, with the exception of the southwestern portion of the property which is in an area inside of the 500-year floodplain [27].

The topography of the property is generally flat with a gentle slope towards the Merrimack River [10]. The surface water runoff is captured by a series of catch basins and directed to a storm water piping network that conveys the water to one of three culverts for discharge to the Merrimack River [1, p. 4-1; 10; 36]. An unnamed stream, located southeast of the AT&T (former) property, flows onto the property and into a culvert beneath the parking area located at the southern portion of the property. The unnamed culverted stream re-emerges at ground level on the southwestern portion of the property and flows into another unnamed stream. The unnamed stream, which receives overland flow from the adjacent Holt Road Landfill, a MADEP listed site, empties into the Merrimack River [10; 35]. According to Lucent representatives, the culvert stream is perennial [30].

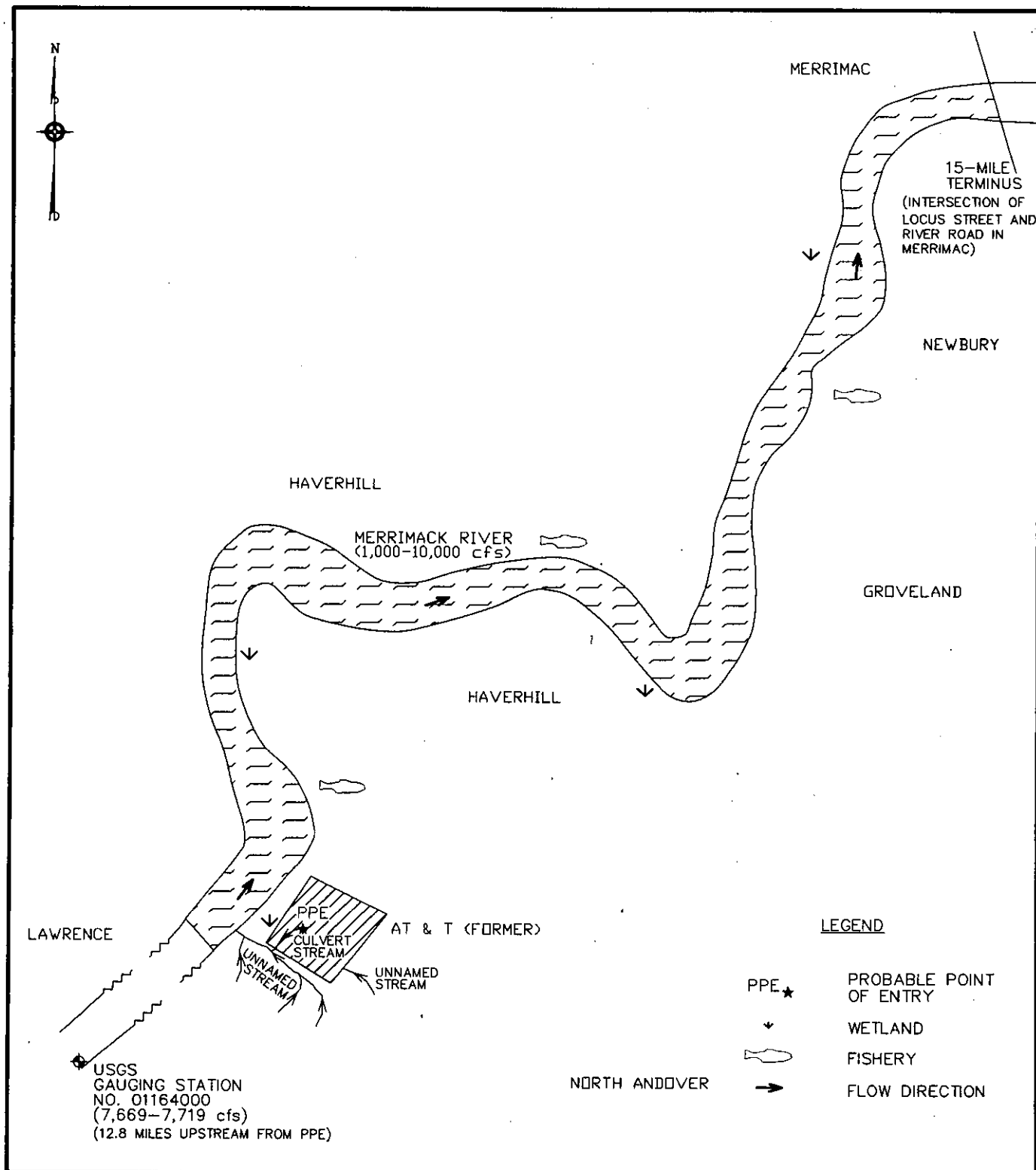
The probable point of entry (PPE) is located in the unnamed culverted stream on the southwestern portion of the property. Surface water flows approximately 0.25 miles into the unnamed stream along the southwestern portion of the property and then flows approximately 0.3 miles northwest into the Merrimack River [10; 30]. The terminus of the 15-mile downstream surface water pathway occurs in the Merrimack River near the intersection of Locus Street and River Road in Merrimac, Massachusetts [5; 6].

The Merrimack River along the surface water pathway from the AT&T (former) property is classified by MADEP Division of Water Pollution Control as a Class SB water supply designated as a habitat for fish or other aquatic life, for primary and secondary contact recreation, and suitable for shellfish harvesting with depuration (Restricted Shellfish Areas) [8]. For the purposes of this report, TtNUS team personnel assume that the culvert and the unnamed stream are not considered a fishery [10; 36].

The average annual flow rate of the Merrimack River, as measured at U.S. Geologic Survey (USGS) Gauging Station No. 01100000, located approximately 12.8 miles upstream of the PPE, is 7,604 cubic feet per second (cfs) [17, p. 43]. Using the USGS estimating flow factor of 1.8 cfs per square mile and USGS 1:25,000-scale topographic maps, the drainage area of the Merrimack River from Gauging Station No. 01100000 to the terminus of the 15-mile downstream surface water pathway was calculated [18]. Based on these calculations, the flow of the Merrimack River at the AT&T (former) property is estimated to be 7,669 cfs and the flow of the Merrimack River at the terminus of the 15-mile downstream surface water pathway is estimated to be 7,719 cfs. Based on visual

observation, the unnamed culvert stream and the unnamed stream have a flow rate of less than 10 cfs and between 10 and 100 cfs, respectively [10]. There are no surface water drinking water intakes along the 15-mile downstream surface water pathway (Figure 3) [11-15].

Andover and North Andover obtain drinking water from two intakes, Fishbrook Station and Merrimack River. These two surface water intakes, located along the Merrimack River, supply water to Haggetts Pond Reservoir [11; 15]. Haverhill obtains their drinking water supply from reservoirs and surface water intakes [12; 15]. However, these surface water intakes do not occur along the 15-mile downstream surface water pathway from the AT&T (former) property.



SURFACE WATER PATHWAY

AT & T (FORMER)

NORTH ANDOVER, MASSACHUSETTS

DRAWN BY:	D.W. MACDOUGALL	REV.:	0
CHECKED BY:	J. PILLION	DATE:	AUGUST 3, 2001
SCALE:	NOT TO SCALE	ACAD NAME:	DWG\0073\1880\FIG_3.DWG

FIGURE 3



TETRA TECH NUS, INC.

55 Jonspin Road Wilmington, MA 01887
(978)658-7899

Methuen and Lawrence obtain their drinking water from the Merrimack River upstream of the AT&T (former) property [13; 15].

Table 7 summarizes surface water bodies located along the 15-mile downstream pathway from the property.

Table 7
Surface Water Bodies Along the 15-Mile Downstream Pathway from AT&T (Former)

Surface Water Body	Descriptor ^a	Length of Reach (miles)	Flow Characteristics (cfs) ^b	Length of Wetland Frontage (miles)
Unnamed Culverted Stream	Minimal Stream	0.25	<10	0.1
Unnamed Stream	Small to Moderate Stream	0.3	> 10-100	0.1
Merrimack River	Large Stream to River	14.45	> 7,669-7,719	1.7

^a Minimal Stream <10 cfs. Large stream to river > 1,000 to 10,000 cfs.

^b Cubic feet per second.

[17; 18; 20]

There are two State endangered species, three State threatened species, and one Federal threatened/state endangered species within 15 downstream miles of the property [19]. Table 8 summarizes sensitive environments located along the 15-mile downstream pathway from the property.

Table 8
Sensitive Environments Along the 15-Mile Downstream Pathway from AT&T (Former)

Sensitive Environment Name	Sensitive Environment Type	Surface Water Body	Downstream Distance from PPE (miles)	Flow Rate at Environment (cfs) ^a
CWA	CWA	Unnamed Culvert Stream	0	<10
Wetland	0.1 miles of wetlands	Unnamed Culvert Stream	0.2	<10
Wetland	0.1 miles of wetlands	Unnamed Stream	0.4	>10-100
Wetland	1.7 miles of wetlands	Merrimack River	0.55 to 15	> 7,669-7,719
State Endangered	Animal	Merrimack River	2.61	> 7,669-7,719

State Threatened	Plant	Merrimack River	5.36	> 7,669-7,719
State Endangered	Plant	Merrimack River	10.05	> 7,669-7,719
State Threatened	Plant	Merrimack River	10.59	> 7,669-7,719
State Threatened	Plant	Merrimack River	10.65	> 7,669-7,719
Federal Threatened/ State Endangered	Animal	Merrimack River	12.76	> 7,669-7,719

^a Cubic feet per second

CWA = Clean Water Act

[17-24]

On April 11, 2000, TtNUS team personnel collected five sediment samples, including QA/QC samples, from the unnamed culverted stream on the property as part of the AT&T (former) property SI [10]. The sediment samples were analyzed for VOCs, SVOCs, pesticides/PCBs, total metals, and cyanide through a DAS laboratory [31; 32]. Sediment samples SD-01 and SD-02 were selected as reference samples. Global positioning of the sediment sample locations was collected by TtNUS team personnel [10]. Table 9 summarizes the sediment sample locations collected by TtNUS on April 11, 2000.

Table 9
Sample Summary: AT&T (Former)
Sediment Samples Collected by TtNUS on April 11, 2000

Sample Location No.	Traffic Report No.	Time (hrs)	Grab/Comp.	Sample Depth (Inches)	GPS Data (Latitude/Longitude)	Sample Information
MATRIX: Sediment						
18-SD-01 (Background)	DO1203	1021	Grab	0 to 6	42° 43' 41.9" N 71° 06' 48.1" W	Reference sediment sample collected in the unnamed culvert stream at the southeast corner of the property. Sample appeared to be olive brown sandy loam; PID = 0.
18-SD-02 (background metals only)	DO1204	1030	Grab	0 to 6	42° 43' 41.6" N 71° 06' 48.1" W	Reference (metals only) sediment sample collected in the unnamed culvert stream at the southeast corner of the property. Sample appeared to be black to olive brown sandy loam; PID = 0.
18-SD-03 MS/MSD	DO1202	0950	Grab	0 to 6	42° 43' 41.7" N 71° 07' 06.1" W	Sediment sample collected in the unnamed culvert stream, ~300 feet downstream of the PPE. Sample appeared to be olive green sandy loam with ~1-millimeter diameter pebbles; PID = 0.
18-SD-04	DO1200	0929	Grab	0 to 6	42° 43' 38.8" N 71° 07' 11.1" W	Sediment sample collected in unnamed culvert stream ~900 feet downstream from SD-03 and ~1,200 feet downstream of the PPE. Sample appeared to be black fine silty loam; PID = 0.
18-SD-DUP-01	DO1201	0916	Grab	0 to 6	42° 43' 38.8" N 71° 07' 11.2" W	Duplicate of 18-SD-04, collected for quality control.

MS/MSD = Matrix Spike/Matrix Spike Duplicate
~ = Approximately
PID = Photoionization Detector

GPS = Global Positioning System
 Comp. = Composite
 hrs = hours
 PPE = Probable Point of Entry

[10]

For each sample location, a compound or element is listed if it is detected at three times or greater than the reference sample concentration. However, if the compound or element is not detected in the reference sample, the reference sample's sample quantitation limit (SQL) or sample detection limit (SDL) is used as the reference value. These compounds or elements are listed if they occurred at a value equal to or greater than the reference sample's SQL or SDL and are designated by their approximate relative concentration above these values. Table 10 summarizes substances detected through DAS analysis of sediment samples collected by TtNUS team personnel on April 11, 2000.

Table 10
Summary of Analytical Results
Sediment Sample Analysis for AT&T (Former) Samples
Collected by TtNUS on April 11, 2000

Sample Location	Compound/ Element	Sample Concentration			Reference Concentration			Comments
18-SD-03 (DO1202)	SVOCs							
	fluorene	220	J	ppb	33	J	ppb	6.7 × REF
	phenanthrene	1,700		ppb	420		ppb	4 × REF
	anthracene	240	J	ppb	82	J	ppb	3 × REF
	carbazole	240	J	ppb	70	J	ppb	3.4 × REF
	fluoranthene	1,900		ppb	650		ppb	3 × REF
	pyrene	2,700	0	ppb	870		ppb	3.1 × REF
	butylbenzylphthalate	300	J	ppb	50	J	ppb	6 × REF
	chrysene	1,200		ppb	410		ppb	3 × REF
	bis(2-EH)phthalate	1,800		ppb	330		ppb	5.5 × REF
	di-n-octylphthalate	290	J	ppb	65	J	ppb	4.5 × REF
	benzo(b)fluoranthene	1,800		ppb	570		ppb	3.2 × REF
	benzo(k)fluoranthene	750		ppb	250	J	ppb	3 × REF
	indeno(1,2,3-cd)pyrene	700		ppb	210	J	ppb	3.3 × REF
	benzo(g,h,i)perylene	650		ppb	210	J	ppb	3.1 × REF

18-SD-03 (DO1202) (cont'd)	PESTICIDES				
	gamma-chlordane	3.1	P	ppb	1.6 U ppb 2 × SQL
	INORGANICS				
	cyanide	1.7		pp	0.53 pp 3.2 × REF
18-SD-DUP-01 (DO1201)	VOCs				
	acetone	330		ppb	65 B ppb 5.1 × REF
	2-butanone	48		ppb	10 J ppb 4.8 × REF
	4-methyl-2-pentanone	17	J	ppb	4 J ppb 4.3 × REF
	SVOCs				
	benzo(b)fluoranthene	1,800		ppb	570 ppb 3.2 × REF
	indeno(1,2,3-cd)pyrene	670		ppb	210 J ppb 3.2 × REF
	benzo(g,h,i)perylene	630		ppb	210 J ppb 3 × REF
	benzaldehyde	98	J	ppb	22 J ppb 4.5 × REF
	PESTICIDES/PCBs				
	endrin ketone	6.8	P	ppb	3.2 U ppb 2.1 × SQL
	gamma-chlordane	6.9		ppb	1.6 U ppb 4.3 × SQL
	aroclor-1254	54		ppb	32 U ppb 1.7 × SQL
	INORGANICS				
	cyanide	1.9		pp	0.53 pp 3.6 × REF
18-SD-04 (DO1200)	SVOCs				
	fluoranthene	1,900		ppb	650 ppb 3 × REF
	benzo(a)anthracene	1,100		ppb	350 ppb 3.1 × REF
	chrysene	1,500		ppb	410 ppb 3.7 × REF
	benzo(b)fluoranthene	2,500		ppb	570 ppb 4.4 × REF
	benzo(k)fluoranthene	900		ppb	250 J ppb 3.6 × REF
	benzo(a)pyrene	1,200		ppb	350 ppb 3.4 × REF
	indeno(1,2,3-cd)pyrene	1,000		ppb	210 J ppb 4.8 × REF
	dibenzo(a,h)anthracene	240	J	ppb	63 J ppb 3.8 × REF
	benzo(g,h,i)perylene	930		ppb	210 J ppb 4.4 × REF
	pyrene	2,600		ppb	870 ppb 3 × REF

18-SD-04 (DO1200) Cont'd)	PESTICIDES							
	gamma-chlordane	6.7	P	ppb	1.6	U	ppb	4.2 × SQL
	aroclor-1254	84		ppb	32	U	ppb	2.6 × SQL
	INORGANICS							
	Selenium	1.1	N	pp	0.78	UN	pp	1.4 × SDL

VOCs = Volatile organic compounds.
 SVOCs = Semivolatile organic compounds.
 PCBs = Polychlorinated Biphenyls
 ppb = Parts per billion.
 ppm = Parts per million.
 SQL = Sample quantitation limit.
 SDL = Sample detection limit.
 REF = Reference sample concentration.
 U = The compound was analyzed for and was not detected.
 B = In laboratory blank (organic analysis).
 J = Estimated value below contract required quantitation limit.
 P = Greater than 25% deviation between columns
 N = Spike %R greater than limit.
 * = Result from dilution analysis

[31; 32]

Complete analytical results for the sediment samples including quantitation and detection limits are presented in Attachment A. Analytical results of the sediment samples indicated that three VOCs, 18 SVOCs, two pesticides, one PCB, and two inorganics were detected above the reference sample concentration (SD-01 or SD-02). Concentrations ranged from 1.4 times the SDL (selenium in SD-04) to 6.7 times the reference sample (fluorene in SD-03) [31; 32]. SVOCs and gamma-chlordane (pesticide) were detected in every sediment sample location in the unnamed culverted stream.

Of the substances indicated in the abovemention table, acetone, 2-butanone, anthracene, fluoranthene, pyrene, chrysene, bis(2-ethyl hexyl) phthalate, benzo(b)fluoranthene, benzo(a)anthracene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)perylene, benzaldehyde, cyanide, and selenium were also detected in soil/source samples collected by TtNUS team personnel from the AT&T (former) property [31; 32]. Please refer to the Waste/Source Sampling section for further information on soil/source sample analytical results.

Based on analytical results from the TtNUS team personnel sediment sampling event, the surface water pathway has been impacted by a release of hazardous substances to the unnamed culverted stream from on-site sources. No known public drinking water intakes are located along the 15-mile downstream pathway.

7.0 SOIL EXPOSURE PATHWAY

Approximately 6,200 people work on the property [10]. Approximately 139,122 people reside within 4-radial miles of the facility [9]. There are no known schools or day-care facilities within 200 ft of an area of observed contamination [5]. The nearest residence is located on Osgood Street approximately 100 ft east of the property. The property is surrounded by a maintained chain-link fence with barbed wire and each entrance has a security station. The three guarded stations provide vehicular and pedestrian access to the property; however, access is restricted to security card holders only. There are no known terrestrial sensitive environments on the property [10].

TtNUS team personnel conducted soil/source sampling as part of the AT&T (former) SI. Please refer to the Waste/Source Sampling section of this report for further information regarding sampling results.

Based on the available data, a release of hazardous substances to surficial soils from on-site sources has not been documented. Furthermore, based on site observations and conditions, property access restrictions, distance to the nearest residence, and lack of public use of the property, no impacts to nearby residential populations are known or suspected.

8.0 AIR MIGRATION PATHWAY

There are no on-site residents associated with the AT&T (former) property. The nearest residence is located approximately 100 feet east of the AT&T (former) property. Approximately 6,200 people work on the property [10]. Approximately 139,122 people reside within 4-radial miles of the facility [9]. There are no known schools or day-care facilities within 200 feet of observed contamination [5].

Table 11 summarizes the estimated population within 4-radial miles of the property.

Table 11
Estimated Population Within 4-Radial Miles of AT&T (Former)

Radial Distance from AT&T (former) (miles)	Estimated Population
On Site	6,200
> 0.00 to 0.25	11
> 0.25 to 0.50	59
> 0.50 to 1.00	2,106
> 1.00 to 2.00	15,759
> 2.00 to 3.00	50,441
> 3.00 to 4.00	70,746
TOTAL	145,322*

* - Includes on-site workers

[9; 10, p. 12]

Table 12 summarizes sensitive environments located within 4-radial miles of the property.

Table 12
Sensitive Environments Located within 4-Radial Miles of AT&T (Former)

Radial Distance from AT&T (former) (miles)	Sensitive Environment/Species (status)
On Site	Clean Water Act 0.4 acre of wetlands
> 0.00 to 0.25	1 acre of wetlands
> 0.25 to 0.50	2 acres of wetlands
> 0.50 to 1.00	38 acres of wetlands
> 1.00 to 2.00	176 acres of wetlands
> 2.00 to 3.00	169 acres of wetlands (1) State endangered species
> 3.00 to 4.00	557 acres of wetlands

[19; 20]

In December 1992, VOC contamination was noted in a former caustic cleaning room in Building 30 by AT&T workers excavating the floor slab and shallow soil to install new process equipment. In 1993, CDM conducted a soil gas survey in the former caustic cleaning room area. Results indicated that detectable concentrations of TCE above 50 ppbv present at distances 200 ft from the suspected source. Soil gas concentrations of TCE above 25 ppmv were identified in soils up to 150 ft from the source area [1, p. 3-23]. In addition, quarterly sampling of the ambient building air was instituted to monitor for VOCs [1, pp. iii, vi, 3-1].

In June 1998, CDM conducted another soil gas survey in the area of the former tank farm. Samples were collected from inside Buildings 30, 70, and 71 and outside in the shipping/receiving courtyard [1, p. 3-23]. Again, soil gas survey results indicated that concentrations of TCE above 50 ppb present at distances 200 ft from the suspected source. Soil gas concentrations of TCE above 25 ppmv were found in soils up to 150 ft from the source area [1, p. 3-23].

In November 1998, 10 ground level ambient air samples were collected by CDM from selected locations inside Buildings 30, 70, and 71. Air samples were analyzed for VOCs using EPA Method TO-15. The indoor air samples were collected using Summa canisters with a 6 liter capacity [1, p. 3-24]. Analytical results indicated TCE at a concentration of 190 ppbv in one sample from Building 71. CDM indicated that this result was a potential health risk if detected in the breathing zone [1, p. 3-26].

In December 1998, three additional ground level ambient indoor air samples were collected in Building 71 to confirm the November 1998 sample results. Analytical results indicated TCE at a concentration of 810 ppbv in one sample [1, p. 3-26].

In response to these results, Lucent initiated a RAM in February 1999 to mitigate infiltration of VOC vapors from beneath the building to the building air. The RAM consisted of sealing all visible cracks in the floor of Buildings 30, 70, and 71. Following the RAM actions, air samples were collected from the breathing zone. According to CDM, no VOCs were detected in the breathing zone at concentrations that pose a significant health risk [1, p. 3-26].

Air samples were collected and analyzed for VOCs by EPA Method TO-15 in 1998. There has been a release of VOC; however, the latest results indicated no VOCs in the breathing zone. For the purposes of this SI evaluation, it should be noted that the soil gas sample analysis conducted at the property is not considered representative of ambient air conditions. In addition, no elevated readings were detected by the photoionization detector (PID) utilized by TtNUS team personnel during sampling activities. No impacts to nearby residential populations or sensitive environments are known or suspected.

9.0 SUMMARY

The AT&T (former) property consists of a 168-acre lot located at 1600 Osgood Street in North Andover, Essex County, Massachusetts. The following sources, located on the AT&T (former) property, are used to evaluate this site: abandoned waste acetone underground storage tank (UST), former solvent tank farm, hazardous waste storage area, vapor phase carbon units, former sand filter beds, contaminated soil, surge tank, underground sump tank, former ferric chloride aboveground storage tank (AST), and former AZ112A stripper AST.

In April 2000, Tetra Tech NUS, Inc. (TtNUS) collected soil/source samples from the industrial wastewater sand filter bed on the property. The following substances were detected in soil/source samples at concentrations greater than or equal to three times the reference sample or greater than or equal to the sample detection limit (SDL) or sample quantitation limit (SQL) of the reference sample: benzene, acetone, 2-butanone, 2-hexanone, anthracene fluoranthene, pyrene, chrysene, bis(2-ethylhexyl)phthalate, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)perylene, benzaldehyde, dimethylphthalate, delta-BHC, aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, vanadium, zinc, and cyanide.

An estimated 220 people receive drinking water from public groundwater wells within 4-radial miles of the property. An estimated 2,365 people receive drinking water from private groundwater wells within 4-radial miles of the property. The following substances were detected in groundwater samples collected from the AT&T (former) property from 1993, 1995, and 1998 at concentrations greater than or equal to the background sample's sample reporting limit (SRL): acetone, toluene, cis/trans-1,2-dichloroethene (1,2-DCE), trichloroethene (TCE), 1,1,1-trichloroethane, tetrachloroethene (PCE), 1,1-dichloroethane, chloroform, vinyl chloride, and 1,1-dichloroethene.

In April 2000, TtNUS collected sediment samples from the unnamed culverted stream on the property. The following substances were detected in sediment samples at concentrations greater than or equal to three times the reference sample or greater than or equal to the SDL or SQL of the reference sample: acetone, 2-butanone, 4-methyl-2-pentanone, fluorene, phenanthrene, anthracene, carbazole fluoranthene, pyrene, butylbenzylphthalate, chrysene, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, benzo(g,h,i)perylene, benzaldehyde, endrin ketone, gamma-chlordane, aroclor-1254, selenium, and cyanide.

There are no on-site residents associated with the AT&T (former) property. The nearest residence is located on Osgood Street approximately 100 feet east of the property. Approximately 6,200 people work on the property. There are no schools, day-care facilities, or terrestrial sensitive environments located on or within 200 feet of an area of observed contamination. Three guarded stations restrict pedestrian and/or vehicular access to the property.

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